

**Economakis, A.E. and P.S. Lobel. 1998. Aggregation behavior of the grey reef shark, *Carcharhinus amblyrhynchos*, at Johnston Atoll, Central Pacific Ocean. *Environmental Biology of Fishes* 51: 129-139.**

**Abstract:**

Free-ranging female grey reef sharks, *Carcharhinus amblyrhynchos*, were observed forming daily aggregations offshore Sand Island, Johnston Atoll between March and late May from 1992 to 1995. Daily water temperatures were recorded at the aggregation area from 1993 to 1995. The annual aggregation cycle did not coincide with maximum or minimum annual water temperatures. During the 1994 aggregation, temperatures were recorded at least every hour at 7 sites in the Atoll. The sharks aggregated most frequently and in highest numbers at the largest and shallowest site, which also contained the fewest underwater structures. The water temperature at this site was 1-2 deg. C warmer than at neighboring sites and at a reef channel between the lagoon and the open ocean. The pattern of movement of sharks to and from the aggregation area was correlated with daily fluctuations of water temperature ( $r = 0.38$ ;  $p < 0.001$ ), tide ( $r = 0.30$ ;  $p < 0.001$ ) and light level ( $r = 0.21$ ;  $p < 0.001$ ) after adjustment for autocorrelated errors. The daily maximum number of aggregating sharks coincided with the daily maximum water temperature. However, the number of aggregating sharks did not necessarily increase during days of higher water temperature. During the 1994 aggregation period, four sharks were fed ultrasonic telemetry tags, and telemetry stations were deployed at three sites within the aggregation area. Individual sharks were tracked returning to the aggregation area for durations of one to five days. The end of detection of tagged sharks is thought to be due to the regurgitation of the indigestible tags, rather than the sharks permanent departure from the aggregating area. Sharks aggregated only during the day; none of the tagged sharks were recorded and no sharks were ever seen at the aggregation area during night time.